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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,570	07/16/2003	Winfried Sabisch	MUH-12712	9244

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EXAMINER

VERSTEEG, STEVEN H

ART UNIT PAPER NUMBER

1753

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/620,570

Applicant(s)

SABISCH ET AL.

Examiner

Steven H VerSteeg

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 11-22, 28 and 30-35 is/are rejected.
- 7) ☒ Claim(s) 8-10, 23-27 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/16/03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7, 11-22, 28, 30, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by US 2002/0175074 A1 to Gung.
3. For claim 1, Applicant requires a PVD method comprising providing a target region and a substrate region in a process region; providing an electric field between the target region and substrate region and using the electric field for partially ionizing process gas constituents in the process region, accelerating ionized process gas constituents toward the target region, ejecting target constituents by using process gas constituents and partially depositing ejected target constituents on the substrate region; and generating a magnetic field substantially vanishing in one of given regions and given sectors of at least one of the target region and the substrate region at least when averaged over time and rotating the magnetic field about a rotation axis.
4. For claim 12, Applicant requires a PVD apparatus comprising a target region and a substrate region disposed spacially separated from one another in a process region containing a process gas and with an electric field to be generated between the target region and the substrate region; and a magnetic field device configured to generate a magnetic field at least at one of the

Art Unit: 1753

target region and the substrate region such that the magnetic field substantially vanishes in one of given regions and given sectors of at least one of the target region and substrate region at least when averaged over time and such that the magnetic field rotates about a rotation axis.

5. Gung discloses a method [0004] and apparatus (Figure 1) comprising providing a target 14, substrate 18, and processing area (Figure 1). The target is biased by a power supply 40.

Argon processing gas is supplied and ionized so that target material is ejected from the target and deposited on the substrate [0009]. A magnetron is behind the target (figure 5). The magnetron rotates (Figure 1). The magnetron results in a zero magnetic field 98 in a target sector (Figure 5).

6. For claims 2 and 13, Applicant requires an axis extending through the target region and substrate region such that the axis connects the target region and the substrate region. Figure 1 shows the rotation axis to be through the center of the target and substrate.

7. For claims 3 and 14, Applicant requires a symmetry axis extending through the target region and the substrate region such that the symmetry axis connects the target region and the substrate region to one another. As can be seen from Figure 1, the rotation axis is through the center of the target and substrate. Thus, the substrate and target are symmetric about the axis.

8. For claims 4 and 15, Applicant requires generating a magnetic field such that the magnetic field substantially vanishes outside the rotation axis in one of given regions and given sectors of the target or substrate region when averaged over time. In Figure 5, the zero field is at the center of the magnetron. The magnetron is offset when rotated (Figure 1). Thus, the vanished magnetic field is outside the axis of rotation.

9. For claims 5 and 16, Applicant requires using a combination of at least a first magnetic field components and a second magnetic field component such that the components are one of

Art Unit: 1753

directly oppositely polarized and directly oppositely directed with respect to one another but otherwise are substantially identical. Figure 5 shows that there are north and south oriented magnets. Thus, the magnetic field components meet the limitations.

10. For claim 6, Applicant requires generating and using the components simultaneously. The magnets operate simultaneously (Figure 5).

11. For claim 7, Applicant requires generating and providing the components diametrically oppositely with regard to the rotation axis and antisymmetrically with respect to one another. The fact that there are north and south orientations to the magnets meets the limitations.

12. For claim 11, Applicant requires performing rotation to generate the magnetic field component. The magnetron is rotated (Figure 1).

13. For claim 17, Applicant requires the magnetic field device to include at least one first and one second magnetic field device. The separate magnets each constitute a separate magnetic field device.

14. For claim 18, Applicant requires the devices to be oppositely polarized. For claim 19, Applicant requires the devices to be posited such that they are oppositely polarized. The magnets are north and south polarized (Figure 5).

15. For claim 20, Applicant requires the devices to be diametrically oppositely with regard to the rotation axis. The magnets are north and south and are rotated.

16. For claims 28 and 30, Applicant requires the magnet field devices to be displaceable in a direction of the rotation axis. The magnets are displaceable because they are rotated.

17. For claim 21, Applicant requires the magnetic field device to be rotatable about the rotation axis. Figure 1 shows the limitation.

Art Unit: 1753

18. For claim 22, Applicant requires the magnet to be rotated and above and outside the process region. Figure 1 shows the limitation.

19. For claim 31, Applicant requires the magnetic field device to include at least one permanent magnet. The magnets are permanent magnets made of stainless steel [0029].

20. Claims 1-7, 11-22, 28, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,770,025 to Kiyota.

21. Claims 1-7, 11-22, 28, and 30 are described above. Kiyota discloses a magnetron sputtering apparatus (abstract) and method of using it (col. 5, l. 1-30). A target 4, substrate 6, and magnetron 9 that rotates above the target, outside the target space is provided (Figure 7). The magnetron is offset from center axis of the target and substrate. The magnetic field vanishes in the vertical direction at certain points and in the horizontal direction at other points (Figure 12). The field vanishes outside the target center and hence, the axis of rotation. There are several magnets that are oppositely polarized (col. 5, l. 31-39).

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. Claims 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,770,025 to Kiyota in view of US 6,500,321 B1 to Ashtiani et al. (Ashtiani).

24. Claim 31 is described above. For claim 32, Applicant requires the magnetic field device to include at least one current-carrying conductor. For claim 33, Applicant requires the magnetic

Art Unit: 1753

field device to include at least one current-carrying coil. For claim 34, Applicant requires the magnetic field device to include at least one of conductor and coils configured to carry electrical currents in a controlled manner and independently of one another. For claim 35, Applicant requires at least one of the conductors and coil to generate a rotating magnetic field having a controllable orientation.

25. Kiyota is described above, but does not disclose the magnets to be coils, conductors, or permanent magnets.

26. Ashtiani discloses that in sputtering systems, the magnets can be electromagnets or permanent magnets.

27. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kiyota to utilize electromagnets or permanent magnets as the magnets because they are conventional material to use in such a situation.

28. Claims 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0175074 A1 to Gung in view of US 6,500,321 B1 to Ashtiani et al. (Ashtiani).

29. Claims 32-35 are described above. Gung and Ashtiani are described above. Gung does not disclose the magnets to be electromagnets.

30. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Gung to utilize electromagnets because of the knowledge that they are art-recognized equivalents.

Allowable Subject Matter

31. Claims 8-10, 23-27, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

32. The following is a statement of reasons for the indication of allowable subject matter: it is neither anticipated nor obvious over the prior art of record to have a method for physical vapor deposition as claimed by Applicant in claim 8 or a PVD apparatus as claimed by Applicant in claims 23, 25, 26, and 29.

33. Kiyota, Gung, and Ashtiani do not disclose the magnetic field components to temporally separated with respect to one another or the magnetic components to be directly oppositely oriented or directly oppositely polarized with respect to one another when rotated between 2 positions, using a magnetic shielding device, or the magnetic field device to be displaceable between a first position relatively closer to the target region and a second position relatively more remote from the target region. Modifying Kiyota or Gung or Ashtiani to provide the limitations would require hindsight.

General Information

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (571) 272-1700.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Denis Boyd at (571) 272-0992.

Art Unit: 1753

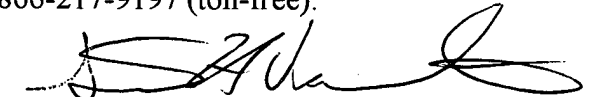
For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (571) 272-1300.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H VerSteeg whose telephone number is (571) 272-1348. The examiner can normally be reached on Mon - Thurs (6:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Steven H VerSteeg
Primary Examiner
Art Unit 1753

shv
March 22, 2005